

Department of Science and Agriculture

BARBADOS

AGRICULTURAL JOURNAL

Vol. 6. No. 2.

April, 1937.

ADVOCATE CO., LTD.,—Printers & Bookbinders to the Government of Barbados.

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Mr. Miller was absent from the Colony on duty leave from 11th to 19th January, 1937, in order to attend the sixth meeting of the Advisory Committee

of the B.W.I. Central Sugar Cane Breeding Station, and also from 20th to 23rd February, 1937, to investigate the suitability of the Vieux Fort property in St. Lucia for Barbadian Emigrants. During these periods Dr. Saint acted as Director.

Dr. Saint was absent from the Colony on vacation leave from May 1st to November 28th, 1936.

Dr. McIntosh was absent from the Colony on vacation leave from May 26th to December 15th, 1936, and on duty leave from 11th to 19th January, 1937, to attend the sixth meeting of the Advisory Committee of the B.W.I. Central Sugar Cane Breeding Station.

Mr. Barker was absent from the Colony on vacation leave from November 22nd, 1936, to May 8th, 1937.

Mr. Coppin was absent from the Colony on duty leave from July 28th to August 6th, 1936, in order to attend the Criminal Session of St. Vincent and give evidence in a case of suspected poisoning.

BRITISH WEST INDIES SUGAR CANE BREEDING STATION.

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BOARD OF AGRICULTURE.

The members of the Board of Agriculture, appointed for the Legislative
Session, 1936–37, were as follows:—

The Honourable S. C. Thorne, M.L.C., Chairman.

The Honourable G. L. Pile, C.B.E., M.L.C.

The Honourable J. D. Chandler, M.L.C.

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The Director of Agriculture is an *ex officio* member of the Board.

REPORT ON THE WORK OF THE DEPARTMENT OF SCIENCE AND AGRICULTURE

for the year ending March 31st, 1937.

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SECTION I.

GENERAL AGRICULTURAL CONDITIONS.

In spite of the prolonged drought experienced during the first four months of 1936 which resulted in very serious losses through the rotting of canes in the field the crop for the island realised 129,256 tons, made up as follows:—

Dark crystal sugar†	102,085 tons
Muscovado sugar	3,176 "
Fancy molasses*	23,995 "
	<hr/>
	129,256 "

For the first year in the history of Barbados more than one hundred thousand tons of sugar were manufactured.

TABLE I.

SUGAR PRODUCTION FOR THE PERIOD 1932—1936.

Calculated as tons of 2,240 lb.

	1932.	1933.	1934.	1935.	1936.	1937 (Estimate)
Dark crystal sugar†	78,423	92,635	79,321	44,138	102,085	103,500
Muscovado ...	4,457	3,386	3,613	2,273	3,176	3,000
Fancy molasses ...	19,535	20,718	28,500	35,076	23,995	19,000
Total ..	102,415	116,739	111,434	81,387	129,256	125,500

TABLE II.

EXPORTS OF SUGAR ETC., IN TONS OF 2,240 LB.

	1932.	1933.	1934.	1935.	1936.
All Sugars ...	74,710	78,994	87,454	39,392	97,811
Fancy Molasses ...	21,715	22,990	27,224	30,919	21,874
	96,425	101,984	114,678	70,311	119,685

† Includes all sugars other than muscovado.

* Equated at 330 wine gallons to one ton of sugar.

This shows an export of 378,361 tons of sugar against a production of 413,507 tons during the five years under review, indicating that, after due allowance has been made for a carry over from 1936 to 1937 that approximately 6,500 tons of sugar is consumed annually in Barbados.

It will be observed from the final column of Table I that the crop at present being reaped is estimated to produce 125,500 tons and but for the dry weather experienced in August and September and the first three weeks of December 1936 there is no doubt but that the production would have exceeded the record of last year.

YIELD OF SUGAR PER ACRE.

Through the co-operation of the plantation owners and managers returns have been received from all estates during the last two years of the acreage of sugar cane reaped:—

YEAR.			ACRES REAPED.	SUGAR PRODUCED.	TONS OF SUGAR PER ACRE.
1936	..	..	(1) 35,570	129,256	3.63
1937	..	..	(2) 35,767	(3) 125,500	3.51

(1) Includes 3,750 estimated acres of peasants' sugar canes.

(2) Includes 3,500 estimated acres of peasants' sugar canes.

(3) Estimate.

Of every 100 acres of arable land under the present agricultural practice prevailing in Barbados, 61 are reaped as sugar cane each year and so the produce of sugar per arable acre has been during the past two seasons:—

1936	..	..	2.21 tons of sugar per arable acre.
1937	..	..	2.14 " " " " "
Average	..	..	2.17 " " " " "

This figure would have been somewhat higher but for the fact that approximately 20 per cent of the crop is represented by muscovado sugar and fancy molasses which require between twelve and fourteen tons of cane to produce the equivalent of one ton of dark crystals compared with the 8.362 tons of cane which was the average taken to produce one ton of sugar by the thirty-three factories which operated in 1936.

FANCY MOLASSES.

The Fancy Molasses Stabilisation Act (1936-12) exerted a very beneficial control on the production of fancy molasses during 1936 but in the absence of any trustworthy information as to the amount of produce required for the market in Canada, Newfoundland and the United States of America, the exporters once again found themselves carrying large stocks of fancy molasses at the end of the 1936 export season, which amounted to approximately two million wine gallons.

Although this figure was half a million more than twelve months previously the situation had improved to the extent that it was believed that the surplus carried over overseas at the end of 1935 had passed into circulation by the end of 1936.

Realising the imperative necessity for rationalising the industry another Act was passed in December 1936 regulating the volume to be produced and exported to a figure which it is anticipated will result in a complete utilisation of all fancy molasses by the end of 1937.

The operation of the Act is under the control of a Fancy Molasses Control and Marketing Board which consists of the Director of Agriculture as Chairman and seven members nominated by the Governor and the two branches of the Legislature.

The production for 1937 has been limited to approximately six and a half million wine gallons which, together with the two million gallons remaining unshipped at the end of 1936, represents an amount which the exporters consider is just sufficient to satisfy the requirements of the consumers..

Barbados exports about 95 per cent of the fancy molasses which leaves the British West Indies for the Canadian and American markets—the remaining five per cent being made up of shipments from St. Vincent, St. Lucia and to a very small extent from St. Kitts.

Now that there is every indication that Barbados has regularised her fancy molasses industry, the question of co-operating with the other exporting islands both as regards production and quality would appear worthy of careful consideration.

PRODUCTION OF FANCY MOLASSES.

The production of fancy molasses in Barbados for the past nine years is summarised below:—

1929	....	....	6,317,435	wine gallons (exports)
1930	....	....	8,163,338	„ „ („)
1931	....	....	7,131,148	„ „ („)
1932	....	....	7,161,027	„ „ („)
1933	....	....	7,589,813	„ „ („)
1934	....	....	9,313,780	„ „ („)
1935	....	....	10,203,139	„ „ („)
1936	....	....	7,918,202	„ „ (actual)
1937	....	....	6,463,600	„ „ (estimated)

TABLE III.

ACREAGES OF SUGAR CANES REAPED IN 1937 ON PLANTATIONS.

	Acreage.						Total.
	Plant Canes.	1st Ra- toons.	2nd Ra- toons.	3rd Ra- toons.	4th Ra- toons.	5th Ra- toons.	
Christ Church ...	2,736	1,126	22	...	...	...	3,884
St. Andrew ...	741	716	496	150	10	...	2,113
St. George ...	1,734	1,528	392	15	...	...	3,669
St. James ...	1,215	788	272	...	...	...	2,275
St. Michael ...	1,170	695	6	...	...	...	1,871
St. John ...	1,371	1,228	809	236	48	...	3,692
St. Lucy ...	1,588	562	34	...	...	...	2,184
St. Joseph ...	736	613	498	170	...	...	2,017
St. Peter ...	1,188	906	443	40	...	...	2,577
St. Philip ...	3,008	1,211	97	6	...	...	4,322
St. Thomas ...	1,432	1,288	795	105	27	10	3,657
Total ...	16,919	10,661	3,864	722	85	10	32,271
%	52.43	33.05	11.99	2.26	0.27	...	100.00

It is estimated that 3,500 acres of peasant canes are being reaped this year compared with 3,750 acres in 1936.

TABLE IV.

ACREAGES OF LEADING VARIETIES OF SUGAR CANE REAPED IN 1937.

Variety.	Plant Canes.	1st Ratoons.	2nd Ratoons.	Other Ratoons.	Total.
B. 2935 ...	8,564	3,534	243	3	12,344
Ba. 11569 ...	365	557	60	16	998
B. 3013 ...	204	3	...	...	207
B. 3234 ...	45	...	...	...	45
B. H. 10 (12) ...	3,384	3,083	2,114	543	9,124
B. 726 ...	4,078	3,259	1,335	244	8,916

It will be observed from the above table that the variety Ba.11569 has been almost eliminated by the B.2935 seedling which indeed is very largely responsible for the large crops reaped in 1936 and 1937.

Two new seedlings B.3013 and B.3234 are represented as commercial varieties for the first time. While the former shows every promise of being a sound variety to grow on the red soil plantations, it is doubtful if the latter will hold its own with the two standard canes, B.H.10(12) and B.726 because of its low juice qualities.

COTTON.

Compared with the other islands of the British West Indies which produce Sea-Island cotton the proportion of cultivated to uncultivated land is very high, and therefore it might be assumed that the problem of eliminating hosts of the pink boll worm other than cotton and so controlling this pest would be correspondingly simpler.

Unfortunately this control has not been successful and during the last four seasons the attacks of this pest coupled with unfavourable climatic seasons for cotton have virtually wiped out the Sea-Island cotton industry in Barbados.

The figures for cotton production of the other British West Indian cotton growing islands show that the pink boll worm is being economically controlled and this control is presumably effected by rigid seed control, a thorough clean up of cotton residues and the observance of what is considered an adequate close season between two cotton crops and the elimination of alternative hosts for the pest.

The Commissioner of Agriculture for the Windward and Leeward Islands has informed me that the cotton growing islands of the British West Indies observe the following close season periods:—

Anguila	....	....	....	2½	months.
Antigua	....	..	..	1½—2	„
St. Kitts	....	....	....	2	„
St. Vincent	....	....	....	3½	„
Nevis	....	....	....	2½	„
Montserrat	....	....	....	2	„
Virgin Islands	..	..	..	5½	„

In Barbados during the past seven years except in 1936, the close season has varied between 3 and 3½ months.

I do not consider that anywhere could greater care be taken over the selection and fumigation of cotton seed than is exercised in Barbados and the clean up is as thorough as could be desired.

On the other hand these measures of fumigating the seed, thoroughly cleaning up cotton residues and carrying out a close season which is as long as, if not longer than the other islands of the British West Indies has not resulted in the economic control of the pink boll worm.

After the original attacks of pink boll worm became so severe as to make cotton growing impracticable a close season for fifteen months was enforced, and after this period, the first large scale cotton crop was planted in 1930.. During the production of that crop and in succeeding years the first appearance of pink boll worm has been recorded as follows:—

COTTON CROP SEASON				FIRST APPEARANCE OF PINK BOLLWORM.
1930-31	..	..	..	February, 1931
1931-32	..	..	..	Late January, 1932
1932-33	..	..	..	Early January, 1933
1933-34	..	..	..	December 6, 1933
1934-35	..	..	..	November 23, 1934
1935-36	..	..	...	November 17, 1935

The above figures show that each season the appearance of the pest has been recorded at an earlier date, and for the first two years after the close season the pest did no economic damage.

It has therefore been decided that a close season shall be maintained from March 31, 1937 until the planting date in 1938—probably in September, and by this control it is anticipated that two economic crops of cotton may be grown in every three years.

THE SPACING OF SUGAR CANE.

For some time past experiments have been carried on to determine whether the sugar produced per acre can be increased economically by the

closing in or other alteration of the different spacings at which sugar canes are planted in Barbados.

These experiments have resulted in the following recommendations:—

From	To
6' x 6'	4½' x 4½'
5' x 5'	4' x 4'

The experiments, as reported elsewhere in this report, have shown the changes to be economic, and it is hoped this year to arrange for practical demonstrations on plantation scale, including actual costings, to be carried out on a number of plantations representing the different agricultural conditions in the island.

GROUND PRODUCE.

The cultivation of sweet potatoes and other ground produce remains at a very low ebb, and it is essential that the strongest representations should be made to re-open the once promising market in British Guiana.

The arable acreage of Barbados which is at present being cultivated is between fifty-eight and fifty-nine thousand acres, and of this area nearly fifty-three thousand acres are growing sugar cane. (To the figures in Table III must be added 3,500 acres of small holders canes, and 17,000 acres of canes planted in November—December 1936).

The value of economic alternative crops to sugar, such as cotton, sweet potatoes and yams cannot be stressed too strongly, as the continued ratooning and production of sugar cane year after year in the same land is fraught with very serious risks to the sugar industry of the colony.

PEASANT AGRICULTURE.

Considerable advance towards the development of peasant agriculture in the colony has been made during the year by:—

- (1) The appointment of a Peasants' Agricultural Instructor.
- (2) The formation of a Peasants' Loan Bank with a capital of £10,000.
- (3) The formation of a Beekeepers' Association.
- (4) The formation of a Ginger Growers' Association.
- (5) The advance by Government of a sum of money to erect a small factory for the newly formed Arrowroot Growers' Association in the Chalky Mount district of St. Andrew's Parish.

Unfortunately, the Co-operative Produce Marketing Association has been obliged to close its retail vegetable depot for a number of reasons amongst which may be cited the growing competition caused by the opening of other vegetable shops under private enterprise and the development of motor delivery services by the leading provision merchants who also handle vegetables and ground provisions.

SECTION II.

(a) REPORT ON PLANT BREEDING AND SEEDLING TESTING.

By A. E. S. McINTOSH, B.Sc., Ph.D.,

Botanist.

I. SUGAR CANE.

A. SUGAR CANE BREEDING, SEEDLING RAISING AND TESTING.

B. SPECIAL INVESTIGATIONS.

II. SWEET POTATO.

I. SUGAR CANE.

A. SUGAR CANE BREEDING, SEEDLING RAISING AND TESTING.

Sugar Cane breeding was carried out at Lion Castle during October, November and December, 1936.

Sixty-five sex determinations were made for varieties, both noble and nobilised, the majority of which were being used as parents for the first time.

In all, seventy-nine crosses were made. These are summarised below.

Group					Number of Crosses	Group Total number of Crosses.
(a)	Crosses between varieties of noble cane (<i>Saccharum officinarum</i>)				14	14
(b)	Nobilisations of <i>chunnee</i> (<i>S. barberi</i>)					
	2nd degree	..	..	..	2}	6
	3rd "	..	..	..	2}	
	4th "	..	..	..	2}	
(c)	Nobilisations of <i>Saccharum spontaneum</i>					
	(i) North Celebes form—tabongo					
	2nd degree	..	..	..	1}	4
	3rd "	..	..	..	3}	
	(ii) Indian form					
	1st degree	..	..	..	1}	3
	2nd "	..	..	..	2}	
	(iii) Java form—glagah					
	2nd degree	..	..	..	1}	31
	3rd "	..	..	..	5}	
	4th "	..	..	..	11}	
	5th "	..	..	..	12}	
	6th "	..	..	..	2}	

	Group	Number of Crosses	Group Total number of Crosses.
	Brought forward		58
(d)	Nobilisations of Uba (<i>S. sinense</i>)— Hawaiian form		
	2nd degree	4	4
(e)	Crosses involving more than two species of <i>Saccharum</i>	17	17
	Grand Total		<hr/> 79 <hr/>

The usual routine methods of collecting arrows, sowing, noting germinations and potting were adopted.

Details of crosses made and germinations obtained will be published in a subsequent report.

Consignments of fuzz of several crosses were sent to New South Wales, Florida and Trinidad, the last named to be used in froghopper resistance tests.

SUGAR CANE SEEDLING POTTING AND NURSERY PLANTING.

Approximately 19,600 seedlings from the above crosses were potted during January and February 1937 and of those approximately 14,900 planted into the field nursery in March and April.

Pottings and field nursery plantings were allocated as follows:—

	Group.	No. Potted.	No. Planted in Nursery.
(a)	Crosses between noble canes (<i>Saccharum officinarum</i>)	13,068	9,628
(b)	Nobilisations of <i>chunnee</i> (<i>S. barberi</i>)	635	500
(c)	Nobilisations of <i>S. spontaneum</i> .		
	(i) North Celebes form	344	306
	(ii) Indian form	460	386
	(iii) Java form	3,385	2,626
(d)	Nobilisations of <i>S. sinense</i>	76	48
(e)	Mixed derivation	1,713	1,423
	Totals	<hr/> 19,681 <hr/>	<hr/> 14,917 <hr/>

During October and November approximately 8,000—9,000 of the nursery seedlings will be selected and planted in the first year seedling trial proper to be reaped in 1939. Selections will constitute the B.39' series.

FIRST YEAR SEEDLINGS—B 38' SERIES.

These were bred at Lion Castle in 1935, potted and planted into the field nursery in 1936.

In October of the season under review, selections were made in the nursery and planted in the first year seedling trial to be reaped in 1938.

A summary of nursery and first year seedling plantings is given here.

Group	No. Crosses	No. in Field Nursery	No. Planted In First Year Seedling Trial 1936-38
(1) Noble cane crosses (<i>S. officinarum</i>)	17	7,950	4,509
(2) Experimental crosses (including higher nobilisations of <i>S. barberi</i> , <i>S. spontaneum</i> and <i>S. sinense</i> ..	42	5,807	3,700
(3) Early nobilisations (i.e., first and second degree) of <i>S. barberi</i> , <i>S. spontaneum</i> and <i>S. sinense</i> ..	7	987	300
Totals	66	14,744	8,509

During the nursery selection work, notes were taken on the appearances of populations of the various crosses.

SUGAR CANE SEEDLING REAPING—B.37' SERIES.

During the 1937 crop, the following seedling numbers were selected from the first year seedling trial:—

Noble cane seedlings	113
Nobilisations	
(1) for trial in mosaic thick cane areas in the British West Indies	66
(2) for trial in thin cane areas in the British West Indies	13
(3) for use as parents in further nobilisation work	29
Total	221

All will be subjected to gumming disease resistance tests in Barbados and a selection of all except those chosen for use as parents only—will be given a second year's trial in Barbados.

On account of the interpolating of the field nursery stage in the sugar cane seedling testing work, no first year seedlings were reaped in 1936. There is thus no B.36' series.

SUGAR CANE SEEDLING TESTING — B.35' SERIES.

During the crop of 1935, 115 noble cane seedlings and 86 nobilisations were selected.

The *noble cane seedlings* during the season under review were multiplied in minor selection plots at Codrington (1935-36) and minor selection and gumming disease resistance test plots at Dodds (1935-37).

Sixty-two seedlings were eliminated in these tests on account of possessing one or more of the following features: (1) susceptibility to gumming disease, (2) pronounced arrowing, (3) low cane number or poor cane appearance, and (4) low juice qualities (crop 1936). The fifty-three remaining were, in November, 1936, put into routine second year trials at a high and a low rainfall station. These will be reaped in 1938.

The nobilised seedlings were multiplied at Codrington during 1935. In October, 1935, these multiplication plots were inspected.

All were planted in gumming disease resistance test plots and observed during season 1935-37.

In addition, forty-eight were selected for a full season (1935-37) trial at Codrington. They were sub-divided as follows, for:—

(a)	thick-cane trial—standard, B.2935 ..	..	34
(b)	thin-cane trial—standard, Co.213 ..	..	14
			<hr/> 48 <hr/>

This trial was reaped in February, 1937, and the following selections made:—

(a)	thick-cane trial	..	..	..	7
(b)	thin-cane trial	..	..	..	6

Two of the selections from the thick-cane trial show promise for Barbados and will be put into select seedling trials for season 1937-39.

Cuttings of all have been sent to the Plant Quarantine Station to be sent, subsequent to quarantine, for test in various British West Indian islands.

Stress will be made in using these selections as parents in further breeding work.

SUGAR CANE SEEDLINGS—B.34' SERIES.

The routine second year testing of thick-cane seedlings selected in 1934 was carried out at Dodds (low rainfall station) and Todds (high rainfall station) during season 1935-37. As usual these were sub-divided into (a) an early and (b) a late group.

Early group — B.3419, B.3429, B.3439.

Late „ — B.3461, B.3464, B.3479, B.3482.

The seedling B.3439 shows considerable promise as an early cane for the low-rainfall district and is being multiplied for test in co-operative variety trials in season 1937-39.

The others will be put into select seedling trials and maturity experiments during the same season.

SUGAR CANE SEEDLINGS — B.33' SERIES.

These thick-cane seedlings were reaped in second year trials during the 1936 crop. The following two seedlings were selected — B.3307, B.3327. These are at present (season 1936-38) undergoing test in select seedling trials and maturity experiments.

SUGAR CANE SEEDLINGS — B.30', 31' AND 32' SERIES.

The following seedlings were reaped during the 1937 crop in plant cane or ratoon select seedling trials—B.3013, B.3124, B.3127, B.3216, B.3234, B.3259, B.3267.

The reaping of these trials has not yet been completed and a detailed report on the results will be published in the near future.

CO-OPERATIVE VARIETY TRIALS. PLANT CANES AND RATOONS. 1935-37.

These are considered under four heads:—

- | | | |
|--|---------|-----------|
| (1) Series of plant cane trials to test B.3124 as an early variety in low-rainfall districts | .. .. . | 5 trials. |
| (2) Series of plant cane trials to test B.3013 and B.3234 against B.726 and B.H.10 (12) in higher rainfall red soils | .. .. . | 4 „ |
| (3) Series of plant cane trials to test B.3013 against B.2935 and B.726 in valley soils | .. .. . | 1 „ |
| (4) Series of 1st ratoon trials to test B.3013 and B.3234 against B.726 and B.H.10(12) in higher rainfall red soils | | 8 „ |

To date all trials under the first three heads have been cut and three of the trials under the fourth head.

The results of testing B.3124 show it to yield slightly in excess of B.726 but appreciably less than B.2935. B.3124 is not such a sound variety as B.726 and has no better juice quality. It also appears to be very susceptible to rotting. This variety will be discarded.

B 3013 does not appear to yield so well in valley soils as B.726 and it is doubtful if it will replace the latter here, even in part. It is hoped that B.3127 will become a standard variety in valley soils. Experiments to test this seedling here have been laid down for season 1936-38.

The yields of plant cane from trials with B.3013 and B.3234 in high rainfall red soils have shown B.3013 to outyield both B.726 and B.H.10(12). It is highly probable that B.3013 will become a commercial variety in these areas. B.3234 yielded as well as B.3014 but, as seen in other trials its juice qualities are markedly inferior to the latter and it will, on this account be discarded.

The variety trials laid down for season 1936-38 are designed to test B.3127 against standard varieties in red soils, valley soils and intermediate rainfall black soils.

B. SPECIAL INVESTIGATIONS.

SUGAR CANE SPACING EXPERIMENTS.

Previous small scale spacing experiments carried out in different environments in Barbados and already reported in this Journal, indicated that increased cane tonnages were obtained from spacings closer than those employed by planters.

It was considered desirable to conduct experiments to confirm these findings on a plantation scale, at the same time determining whether or no any increased tonnages obtained by closer spacings were economic.

Estimated increases in cost to produce canes at spacings closer than $6' \times 6'$ were worked out from individual field operation cost supplied by several planters. These are as follows:—

Crop.	Spacing.	Increase of cost of production per acre.	Increase in cost expressed in tons of cane when cane is sold at \$3.50 per ton.
		\$ C.	
Plant Canes ...	(1) 6' \times 6'	...	Approx. 1 ton
	(2) 5' \times 5'	3 43	" 2 "
	(3) 4½ \times 4½	6 26	" 2¾ "
	(4) 4' \times 4'	9 56	" "
Ratoons ...	(2) 5' \times 5'	1 83	" ½ "
	(3) 4½ \times 4½	3 36	" 1 "
	(4) 4' \times 4'	5 10	" 1½ "

Three plantations were chosen to represent the following major conditions in Barbados:—

- (1) low rainfall black coral limestone soil.
- (2) intermediate rainfall black coral limestone soil.
- (3) high rainfall red coral limestone soil.

The varieties used respectively were B.2935, B.726 and B.H. 10(12).

The size of plot and lay-out were essentially similar to those employed in co-operative variety trials.

The fields were selected by officers of the Department. The spacing at each station was normal for the district. These spacings and those compared are noted here:—

District				Normal Spacing	Tested Spacing
1	..	..	..	6' x 6'	4½' x 4½'
2	..	..	..	5' x 5'	4' x 4'
3	..	..	..	5' x 5'	4' x 4'

The closer spaced cane holes were dug by Departmental labour under supervision. Artificial manure was supplied and applied by the Department: the amounts given being at the same rate per acre for both spacings at any one place. The kind of artificials and its time of application were in accordance with Departmental recommendations.

The canes were reaped and weighed by the estates concerned under the supervision of the Second Field Assistant of the Department.

The yields are summarised below:

District.	Spacing and Yield (Tons per Acre.)				Increase of closer spacing.
	6' x 6'	5' x 5'	4½' x 4½'	4' x 4'	
1	34.71	...	38.78	...	4.07
2	...	29.33	...	31.25	1.92
3	...	34.67	...	39.21	4.54

The closer spacings in all cases gave increased yields, which are economic especially in districts (1) and (3).

These trials are being carried on into the ratoon stage.

ZEISS HAND REFRACTOMETER STUDIES.

Experiments have been carried out to test the value of this instrument in indicating sucrose content in seedlings and the comparative ripening rates of seedlings.

The results of tests in 1935 have been published in Vol. 5 No. 1 of the Journal of the Department of Science and Agriculture, Barbados, 1936. There it was seen that by certain sampling methods, very reliable indications of comparative sucrose content in first and second year seedlings could be obtained.

During the crop of 1937, field officers in charge of reaping gangs undertook Zeiss Hand Refractometer seedling tests in first and second year seedlings. The sampling methods employed were similar to those found most efficacious and convenient in the 1935 experiments.

The use of the Zeiss Hand Refractometer by field officers in assessing comparative sucrose content in first and second year seedlings will become in future crops a routine measure.

The Zeiss Hand Refractometer was used in the maturity experiments in the 1937 crop, to see in how far it could indicate the comparative rates of seedling chemical maturation.

The Zeiss Hand Refractometer experiments conducted during the 1937 crop will be reported in detail in a future publication.

FUZZ STORAGE EXPERIMENTS.

A second series of fuzz storage tests was carried out during 1936.

The effect of the factors (1), amount of calcium chloride per 1000 ccs. storage space and (2), storage temperature on viability of fuzz after storage were tested.

The conclusions from this second series of tests were that storage with about 20 grams calcium chloride per 1000 ccs. storage space and at a temperature near freezing point were the most satisfactory treatments employed.

A detailed account of these fuzz storage tests is in process of being published as a bulletin of the British West Indies Central Sugar Cane Breeding Station.

MATURITY EXPERIMENTS AND GROWTH MEASUREMENTS.

These are investigations which are made each year to obtain information on the growth characteristics of select seedlings, and on their relative rates of vegetative and chemical maturity during the crop period. Their results have application in the allocation of seedlings to particular areas and for particular times of reaping in subsequent large scale variety trials.

Routine fortnightly growth measurements were made, in the plant cane maturity experiments, on the following seedlings during 1936: B.2935, B.726, B.3013, B.H.10(12), B.3259, B.3267. In addition the following were measured as first ratoons: B.H.10(12), B.726, B.3216 and B.3234.

At the reaping of the experiments, the usual field and chemical data were obtained for the three times of reaping.

ROOT SYSTEM INVESTIGATIONS, 1935-1936.

The last investigation was made during May 1936, and a detailed account of the complete series, which involved examinations at four times during the growing season, was published in Bulletin 11, of the British West Indies Central Sugar Cane Breeding Station.

While the root system investigations which have been completed have yielded useful information, and the results are of considerable scientific value, it is emphasised that they refer only to a particular soil environment. Further it has been impossible to carry out similar studies elsewhere in the British West Indies. It is allowed that an investigation aiming to evaluate the root absorbing powers of different seedlings might yield results of great scientific interest, but it is felt that such work cannot in the near future be applicable to problems of cane breeding. Consequently root system investigations have been discontinued for the present.

GUMMING DISEASE STUDIES.

Routine gumming disease resistance trials of newly produced seedlings were continued during 1936.

Examinations of seedlings for gumming disease resistance are made at fortnightly intervals at Dodds in the multiplication plots of first year seedling selections, and in special plots which include seedlings derived from a wide range of parent material, involving the blood of several species of *Saccharum*.

From the results of these examinations it is possible to eliminate susceptible seedlings at an early stage in their trials. Moreover, the records serve to guide the breeding work by adding year by year to the accumulating data on the inheritance of resistance to the disease.

During 1936 observations were made on the susceptibility of one hundred and fourteen noble cane seedlings. Thirty-one of these were eliminated from further trials on account of their susceptibility.

Ninety-nine seedlings containing a greater or less proportion of wild blood were also observed. Of these, only seven showed susceptibility.

A SHORT NOTE ON PRELIMINARY INVESTIGATIONS INTO THE FACTORS INFLUENCING
ROTTING OF CANE AND THE RATOONING OF SEEDLINGS.

These investigations were begun during the crop season 1937, with the object of obtaining information on the differential behaviour of seedlings to rotting during the crop period and to ratoon "springing," both of which are felt to be of vital importance to the sugar industry of the British West Indies. It is hoped in future to extend and intensify the investigations, with the object of finding methods whereby seedlings can be evaluated in these respects at an early stage in their trials.

Data on cane rotting was obtained at the reaping of the select seedling trials, and on ratoon "springing" by examination of stools removed from the field about two months after cutting of the plant canes.

II. SWEET POTATO.

The object of the work on sweet potato is to produce seedlings giving high yields of potatoes of good cooking and keeping quality under long and short cropping conditions.

The first series of seedlings was raised in 1928. These were tested until 1935, when three were finally recommended for commercial planting, i.e., B.5, B.6, B.44.

The progress report here records tests with a second series raised in 1932.

From the *long crop* trial reaped at Golden Ridge in May, 1935, twelve seedlings were selected.

These together with the three best seedlings selected from the first series of trials and used as standards, were tested in a long crop trial at Walkes Spring. This trial lasted from November, 1935, to May, 1936. At reaping, yield data was taken and observations made on size and shape uniformity, flesh colour and smoothness of the potatoes. Cooking tests were carried out on all seedlings.

The following seedlings were finally selected:—B.52, B.55, B.58, B.62, B.63, B.64.

From the *short crop* trial reaped at Codrington in 1935, six seedlings were selected.

These together with Red Nut and the three best seedlings of the first series of trials were tested in a short crop trial at Codrington from July to November, 1936. The usual data was obtained.

All six, together with the six selected at the Walkes Spring trial and three standards—B.5, B.44 and V.52, were planted at the end of October in a long crop trial at Bagatelle Plantation. This trial will be dug in May.

It is the intention to test all twelve seedlings (the survivors of the second series of seedlings) in both long and short crop trials and to issue the best of these (as determined by these trials) for planting commercially.

(b) CHEMICAL.**REPORT ON CHEMICAL SECTION****BY**

S. J. SAINT, M.Sc., Ph.D., F.I.C.,
Assistant Director and Chemist.

I. ANALYTICAL WORK.

1. FOOD AND DRUGS LABORATORY.
2. SUGAR LABORATORY.
3. ANALYSIS OF SEEDLING CANES.

II. ADVISORY AND INVESTIGATIONAL WORK.

1. SUGAR AND SYRUP MANUFACTURE.
2. SOILS.
3. MANURING.

I. ANALYTICAL WORK.**1. FOOD AND DRUGS LABORATORY.**

The total number of samples examined in this laboratory for the various Government Departments and for private individuals during the year was 1,282.

The number and distribution of samples dealt with annually for the past four years is set out in Table I:—

TABLE I.

	1933.	1934.	1935.	1936.
1 Police Department	236	317	494	516
2 Customs „	197	212	131	88
3 Public Works „	12	26	13	8
4 Agricultural „	241	147	45	55
5 Sanitary „	6	17	10	10
6 Agricultural Society	254	236	349	349
7 Other Govt. Departments ...	18	5	3	13
8 Private Individuals „ ...	295	232	229	243
	1,259	1,192	1,274	1,282

Fuller particulars of the various samples analysed in the Food and Drugs Laboratory for 1936 are as follows:—

1. Police Department:

Viscera and Examinations for Poisons	..	..	56
Coins and Counterfeit Exhibits	..	..	135
Butters, Margarine and Cooking Oils	..	..	78
Milks	..	..	61
Tea, Coffee and Cocoas	..	..	88
Rums	..	..	87
Miscellaneous	..	..	11
Total	..	..	516

NOTES.

Examinations for Poisons.

Arsenic—samples of viscera from a person suspected of having died from poisoning were examined and the equivalent of three grains of white arsenic were found to be present.

Atropine—an analysis was made of viscera from a person who had died after drinking a “bush tea” reputed to have been an infusion from “*Argemone mexicana*.” A small quantity of alkaloid was separated which gave positive tests for Atropine.

Zinc Salts—a sample of sugar was examined for poisons and was found to contain approximately 10 per cent. of a black substance which proved of similar composition to the material used in filling dry cell batteries. Soluble zinc salts were present.

Powdered Glass—powdered glass was separated from a sample of table salt and from two samples of sugar which were sent for examination.

Alkalies—a sample of milk was found to contain one quarter ounce of caustic soda and a sample of drinking water the equivalent of 8.1 grams of ammonia per gallon.

Quinine—some cooked food which was suspected of containing poisons proved on examination to contain two and a quarter grains of quinine.

Portland Cement—a sample of coffee was found to contain one-eighth ounce of Portland cement.

Abortion—some tablets similar to those which had been reputed to have been taken to cause abortion were found to contain quinine, ergot and calomel.

Coins and Counterfeiting Exhibits.

A very large number of coins and exhibits, used in connection with counterfeiting were received for examination and report during the year. Sixty-

one coins were examined and fifty proved to be counterfeit. Exhibits consisted mainly of plaster of paris, moulds, metal alloys, files, etc.

In one case, a counterfeit half-crown was shown to be similar to a genuine one found in the possession of the accused. Enlarged photographs on which identical defects were easily apparent were submitted to the court.

Butter, Margarine and Cooking Oils.

One sample of so-called butter was found to be margarine, and two cooking oils, sold as cotton seed oil, were found to be coconut oil. The other samples examined proved to be of good quality.

Tea, Coffee, Cocoa.

All samples of tea and coffee proved of satisfactory quality. Eight samples of cocoa were found to contain less than 20 per cent. cocoa fat.

Milks.

Sixty-one samples of milk were received for analysis, and of these fourteen were found to contain added water and four were found to be deficient in butter fat.

Rums.

Eighty-seven samples of rum were examined and, of these, six were found to be below the statutory strength of 25 degrees under Proof.

Miscellaneous.

Amongst these samples were six articles of clothing received in connection with cases of sulphuric acid throwing. A liquid sold as rum proved to be a sugar solution coloured with caramel.

2. Customs Department:

Petroleum	..	..	..	..	39
Condensed Milks	..	..	..	..	6
Butters and Margarines	..	..	..	..	27
Textiles	..	..	..	..	3
Miscellaneous	..	..	..	..	13
Total	..	..	..	..	<hr/>88 <hr/>

Petroleum.

These samples consisted chiefly of kerosene oil for flash point determinations and petrols for specific gravity determinations. All of the samples of kerosene oil had flash points well within the limits prescribed by the Petroleum Act.

Two samples of crude petroleum were distilled and the petrol and kerosene fractions determined.

Three samples of petroleum were received for examination and report as to recommended classification under the Customs Tariff Act.

Condensed Milk.

All the samples of condensed milk examined were found to contain more than 9 per cent. fat and were classified accordingly.

Butters and Margarines...

Under the Food and Drugs Act, all butters and margarines must contain less than 16 per cent. water before being allowed import. Of the twenty-seven samples examined, four samples were found to contain more than 16 per cent. water.

Textiles.

These samples were examined in respect of their cotton and silk contents; they were all found to consist of 100 per cent. silk.

Miscellaneous.

Various samples such as asphalt, bitupaint, duco, malted milks, etc., were received for examination and expression of opinion as to classification under the Customs Tariff Act. Samples of wood naphtha were received for report on their suitability for the denaturing of alcohol.

3. Public Works Department.

One sample of oil, as used at the various pumping stations, was analysed and found to be up to the guaranteed specification.

Analyses of water, as supplied to the general public, were carried out periodically during the year. The analyses showed a high chemical organic purity.

4. Department of Agriculture.

Twenty-seven samples were received for analysis including samples of sour grass, maize and rat baits. Periodic determinations of the calorific value of the local gas were made and it was found that a satisfactory standard was maintained.

5. Sanitary Department.

Various samples of food, including rice and salt fish, which were suspected of being unfit for human consumption, were examined and reported upon.

The free chlorine was determined periodically in the E. C. disinfectant, which is manufactured by this Department by an electrolytic process, in order to verify that the correct strength was maintained.

6. Agricultural Society.

Under the Fertilizers and Feeding Stuffs Act, samples are taken by the official samplers of the Agricultural Society, and sent in for analysis. During the year, ninety-four samples of feeding stuffs and thirty-nine samples of fertilizers were analysed. All samples were found to correspond closely with their guarantees.

Two hundred and sixteen samples of sugars and molasses were analysed in connection with the prize awards of the Annual Industrial Exhibition. A report of the results of these analyses was submitted to the Agricultural Society.

7. Other Government Departments.

General Hospital	11
Leper Asylum	1
Central Road Board	1
Total	13

Periodical determinations of the free chlorine content were made in samples of disinfectant manufactured at the hospital. A sample of milk from that supplied to the Leper Asylum was analysed and found to contain added water. An analysis and report were made on a sample of bitumen submitted by the Central Road Board.

8. Private Individuals.

Analyses were carried out for private individuals for which fees are charged by Government in accordance with the scale of fees set out in the Schedule to the Department of Science and Agriculture Act.

The following analyses were carried out during the year:—

Sugars and Molasses	89
Cane Juices	78
Hydrometers for Calibration	18
Fertilizers	24
Textiles	7
Milks	12
Miscellaneous	15
Total	243

The fees receivable by Government for these analyses amounted to £67. 12. 6.

2. SUGAR LABORATORY.

Most of the consignments of sugars, fancy and choice molasses sent to Bridgetown are sampled, and the samples are analysed in this Laboratory. This analysis serves as a basis in assessing the price paid by the buyer to the manufacturer.

As this Laboratory has been organised and run as a commercial undertaking by Government, particulars of the number of samples dealt with, and of the revenue and expenditure are given in Table II for the past eight years.

TABLE II.

Financial Year,	Number of Samples.		Expenditure			Revenue Receivable.			Excess of Revenue over Expenditure		
	Sugar.	Molasses.	£	s.	d.	£	s.	d.	£	s.	d.
1929-30	29,978	8,114	868	0	0	1,904	12	0	1,036	12	0
1930-31	20,181	9,899	798	0	0	1,504	0	0	706	0	0
1931-32	18,141	9,712	715	0	0	1,392	13	0	677	13	0
1932-33	25,916	8,194	761	0	0	1,705	10	0	944	10	0
1933-34	36,669	10,947	797	0	0	2,380	16	0	1,583	16	0
1934-35	18,071	10,092	600	0	0	1,408	3	0	808	3	0
1935-36	43,744	10,998	710	0	0	2,737	2	0	2,027	2	0
1936-37	41,255	6,267	783	15	8	2,426	2	0	1,642	6	4

The sugar and syrup laboratory was originally designed to deal with a maximum of three to four hundred samples per day. During the last two crop seasons, on some days, over nine hundred samples were received for analysis, and, during the busy months, an average of over six hundred samples per day were dealt with. Extra bench room has been provided in the Food and Drugs Laboratory, but this has only partially relieved the congestion. The Government has under consideration plans for the erection of a new laboratory in which more space has been allotted for this work. It is to be hoped that the erection of this laboratory will be expedited.

3. ANALYSIS OF SEEDLING CANES.

In connection with the genetical work and manurial trials carried out by the Department, representative samples of cane are received for analysis.

During the year a total of 1,893 bundles of cane were milled in the Machinery Room and the expressed juice analysed. Where the composition of the whole cane was needed, analyses of the megass were also made.

The results of these analyses will be incorporated in the variety trial reports of the Botanist, and in the accounts of the manurial trials by the Chemist.

II. ADVISORY AND INVESTIGATIONAL WORK.

1. SUGAR AND SYRUP MANUFACTURE.

A large number of advisory visits were made by the Chemist during the crop season to dark crystal, muscovado and fancy molasses factories.

The growing season of 1935 was very favourable to sugar cane, but the rainfall for the months of December and January 1936 was below average, and the ensuing crop season was also very dry. The result was that reaping started early and was proceeded with rapidly. Most factories made record quantities of sugar per week. The crop ended for most factories by the end of April or the beginning of May. Notwithstanding the expeditious manner in which the crop was reaped, there was a good deal of dry cane left in the field.

The new seedling B.2935 was reaped to a large extent in the 1936 crop season for the first time. This seedling has a low fibre content, and, at the beginning of crop, when the juice was relatively watery, factories experienced a shortage of fuel. As the crop proceeded and the juice became sweeter, this difficulty disappeared.

Chemical Control:

The scheme for providing chemical control of the manufacturing process in smaller vacuum pan factories was continued successfully. It is to be noted that three of these factories have now been equipped with crystallisers with further marked improvement in efficiency.

In syrup and muscovado sugar manufacture, the value of pH control which has been introduced is generally recognised, and most plants are now so equipped. The provision of the Aspinall pans with thermometers has also proved of considerable value in controlling the density of the syrup at striking.

Investigational:

A new method for the determination of the polarisation of fancy molasses without using a polariscope has been evolved and arrangements have been made to try the method out in the 1937 crop season. This method has been evolved in response to enquiries for a simple, rapid and inexpensive method for the determination of polarisation of fancy molasses. Few, if any, of the small syrup plants can afford to purchase a polariscope, and yet a knowledge of the polarisation of the end product is of vital importance.

The small experimental vacuum pan was installed at Bulkeley Factory through the kindness of the owners, and, as time from other duties permitted, experimental work was carried out on pan boiling with the aid of the enitometer and pan refractometer. Different methods of graining were the main objects of investigation.

2. SOILS.

Advisory:

Samples of soil are taken on request from plantations for analysis, and from the analytical results and the data which has been accumulated on local soils, advisory reports are issued giving manurial and other recommendations.

Investigational:

Soil samples have been taken from the manurial trial plots, both on sugar cane and sour grass, and have been analysed for exchangeable potash and

total nitrogen. Some very interesting results were obtained, which have been described in detail in the previous number of this Journal.

3. MANURING.

Sugar Cane:

Trials to test the effect of various amounts and kinds of fertilisers on the yield of cane and per cent. sucrose in juice, have been carried out at different plantations. The results of these trials bear out the results obtained in previous years and indicate that, although the behaviour of soils on different plantations may vary with their previous history, nitrogen and potash deficiencies will show up in a short time if land is not manured with these constituents.

Recent trials to investigate the effect of time of application of sulphate of ammonia on the yield and per cent. sucrose in cane indicate that the best results are obtained by applying all the sulphate of ammonia in one dose in June, i. e. at the commencement of the rainy season. The plantation practices of giving part of the nitrogen in the early cane manure in January, and of giving the main dressing of sulphate of ammonia in two applications in June and August or September have not given such good results as the one application in June.

Sour Grass:

The permanent manurial trials on sour grass, which were laid down at a red and black soil centre in 1931 have been continued. The results to date were given in detail and discussed in the last issue of this Journal.

(c) **REPORT ON THE ENTOMOLOGICAL SECTION
FOR THE YEAR ENDING 31st MARCH, 1937.**

BY

R. E. W. TUCKER, M.A., B.Ed.
Entomologist.

The small moth borer *Diatraea saccharalis* still remains the outstanding entomological problem in an agricultural community depending, as Barbados does, practically entirely upon the growing of sugar cane.

The year under review has seen a doubling in the equipment for rearing the egg parasite *Trichogramma minutum*, so that at least 230 million parasites should be available for distribution in future. The use of wheat instead of corn or maize in the breeding units has given increased production and an extended use of wheat will be made in future.

There has also been further progress in the obtaining, analysing and correlation of data relating to the effect of cane varieties on moth borer damage. That the different varieties of cane influenced the extent of attack and final damage by borer was recognised at an early stage of moth borer control work, and investigations were started in 1932. Limitations imposed by the complexity of the problem, the long growth period and annual reaping of the crop, and by the time and staff available for the work necessarily result in slow progress.

Progress has however been made, and preliminary results obtained from investigations on the interaction of cane varieties and moth borer damage are given in *Agricultural Journal*, Department of Agriculture, Barbados, Vol. 5, No. 4, October 1936.

There has also been progress in the study of *Euscepes batatae*, and field and laboratory work on this pest of sweet potatoes is being concluded.

Investigations into the damage caused to buildings in Bridgetown by termites has been made possible by the appointment of a temporary officer for this work during the year under review.

A summary of work carried out in the entomological section is given below.

SMALL MOTII BORER—DIATRAEA SACCHARALIS.

The extent of borer damage to cane was estimated on the same lines as in previous years at twelve factories, and in sixty-seven fields of ripe cane selected and prepared for examination by plantation managements. The only modification introduced was to take a proportional sample of each 200 canes examined, in place of a sample from the total of 1,000 canes examined at each factory; these samples as described in other years, are dissected in the laboratory in order to obtain true counts of internode infestation. A com-

parison between external counts and dissection counts of the *same samples* made in 1936 and 1937, showed that to change over to external counts would automatically reduce infestation counts by between 13% and 14%. This would destroy the comparability of figures from previous years, which was not considered advisable even though external counts definitely gave lower figures than dissection counts. As the same twelve factories are visited on approximately the same dates each year, and as the samples taken are representative of the areas served by these factories at the time, the results obtained have been hitherto considered sufficient to indicate the general level of moth borer infestation, and to be comparable year by year. The same applies to total loss counts in the sixty-seven fields examined.

The effect of cane varieties and the extent of planting of varieties undoubtedly complicates the assessment of results in Barbados, and although 'varietal effects' were recognised early in borer control work, and investigations were started in 1932, it is only now that sufficient records are available to give even indications as to the trend of such effects.

For the last two years, three varieties only have been examined at factories, namely, B.H.10(12), B.726 and B.2935; the two former have been commercial varieties for many years in Barbados, and the latter only recently established as a commercial variety.

In 1936, internode infestation for B.H.10(12) was 19.7%, and in 1937 it was 17.15%; for B.726 it was 18.26% in 1936 and 16.86% in 1937; for B.2935, however, it was 16.04% in 1936 and 19.20% in 1937.

As B.2935 has, in coastal or drier black-soil areas, taken the place of Ba.11569 which, during the last years of its use as a commercial variety, averaged between 13% and 14% internode infestation, the net result of recent varietal changes and extent of plantings would appear to have increased average infestation in the dry areas. Nevertheless, the average internode infestation for all counts, including B.H.10(12), and B.726 grown in wetter areas, was 18.24 % in 1936 and 17.7% in 1937, which indicates a reduction in general borer population.

It is worth noting that the internode counts made in 1937 include infestations as high as 23.7% for B.H.10(12), 28.3% for B.2935 and 34.1% for B.726. Such high figures are only occasionally encountered now, but they show clearly that extensive damage by moth borer is still possible, should there be no control over it.

Parasite liberations in 1936 affecting crop reaped in 1937, totalled 159,997,700.

That the damage caused by *Diatraea saccharalis* to sugar cane in Barbados has been reduced, is shown by Table I which gives all records from 1929 to 1937.

ESTIMATES OF LOSS DUE TO MOTH BORER IN BARBADOS.

TABLE I.

Year.	Average percentage Joints bored at Factories.	Total loss in Fields in Percentage of Crop.
1929	No counts made	20.0*
1930	33.5	14.0
1931	27.3	12.0
1932	17.8	13.5
1933	14.5	11.0
1934	13.6	10.0
1935	17.1	9.4
1936	18.2	12.0
1937	17.7	9.0

Percentage joint or internode infestation is not considered adequate by itself, though it is the principal, and in some cases, only method used for estimating infestation elsewhere. Total loss of cane killed as shoots or rendered unrepairable as fully grown canes, must be considered with internode infestation, and in Table I both are given.

It is recognised by all workers on infestation of sugar cane by small moth borer, that there is a possibility of annual fluctuations in extent of *Diatraea* infestation due to various factors, of which climate, as considered in terms of total rainfall, time of distribution of rainfall, temperature and humidity plays a large part.

Such fluctuations have obviously occurred in Barbados, but in the writer's opinion, control by timed liberations of *Trichogramma* has the effect of limiting such fluctuations to a lower level.

In Barbados, as is pointed out, the effect of introducing the new variety B.2935 has been, from available evidence, to cause a rise in borer prevalence in the drier, black soil areas, and so to increase slightly the average annual figures of infestation for 1936 and 1937.

* Total loss in 1929 was estimated at 31% including damage to reparable canes, for which no separate estimates were made. Total field loss is estimated at 20%.

This is not to be considered as any condemnation of B.2935 which has other factors such as tonnage and sugar per acre in its favour; it is a statement of facts as at present available.

The climatic factor is recognised by all who work on the relation of climate to insect infestation as being a complicated one, needing close and special investigation.

By the examination of field records kept during two years of diverse climatic conditions, namely 1933 and 1934, it was possible to obtain some indication of the effect of prolonged dry weather on moth borer infestation.

It was shown that the pest was affected, the parasite *T. minutum* and the predator *Belaustium* sp. (previously recorded as *Atomus* sp.) were affected, and that the host plant and growth thereof was affected.

The results obtained and deductions made from the above records, have been published in Agricultural Journal, Department of Agriculture, Barbados, Vol. 4 No. 3, pp. 114—127. No finality at all was claimed for these records, but they were considered adequate to forecast a rise in infestation in the crop reaped in 1935 which, in fact, occurred.

A further rise occurred in 1936, due in part to the practically entire replacement of Ba.11569 by B.2935, and possibly to the fact that any upward swing in borer infestation may be continued into the next crop and cannot be reduced in one year over the crop as a whole.

The net result of total loss counts and per cent joints bored in reappable cane in 1937, is to show that despite all factors which may cause fluctuations in borer damage, such damage is maintained at less than half its original figure. This, over the period of years for which impartial records have been obtained, shows that *Trichogramma* liberations are at least a commercial success.

On the investigational side, field work has been carried out during the year under review on extent of *Diatraea* egg deposition, parasitism, larval survival, and on larval migration.

The extent of larval migration has again been shown to be such that no plot experiments, however large, can omit this factor.

Work has been carried out on borer infestation in different cane varieties from the dead heart stage, through various stages of cane formation, to counts of internode infestation in the same varietal plots when reaped. The results obtained have shown sufficient correlation to justify an extension of this line of work.

There has been no apparent reappearance of the larval parasite *Lixophaga diatraea*, but detailed searches of fields of young cane, and dissection of dead hearts have not been made this year in time for this Report.

ROOT BORER OF SUGAR CANE (*Diaprepes abierciatus*), AND BROWN HARDBACK (*Lachnosterna smithi*).

A further effort was made to combine the planting community into small compact groups of plantations, each group of around 1,000 arable acres reporting to a local organiser, who in turn reported to the Department. It was hoped by this means to obtain fuller particulars as to any local outbreaks of either pest, or details of any suspected damage, which would be investigated at once. It was also hoped to stimulate and increase the control of both pests by hand picking and cultural methods.

Owing to the lack of co-operation in this scheme, it is difficult to say whether either of the above pests still constitute a serious menace to cane growing, particularly to ratooning. A total of 3,109,600 root borer beetles and 213,660 root borer egg masses, and 3,299,300 brown hardback beetles were reported as collected in June to October 1936.

The introduced predator *Pyrophorus luminosus* has definitely been seen in small numbers in the adult stage, and has been reported in the larval stage during digging operations; there has been no opportunity of confirming the latter finding. Developments elsewhere in parasite introductions for the control of 'white grubs' are being watched, and anything likely to be of assistance to the sugar industry of Barbados will be obtained if possible.

SCARABEE.—EUSCEPES BATATAE.

The scheme of investigation for this pest has been carried out on the lines given in the 1936 Report. Field work has shown the percentage of potato slips infested with scarabee which are liable to be planted if slips (or cuttings) are taken from an infested field. From this, the number of female *Euscepes* likely to emerge can be computed; also, from laboratory records, the average egg laying period of the female beetle has been obtained, together with the total number of eggs laid per female, eggs laid per day, seasonal variations in egg deposition, percentage hatch of eggs, larval survival, and total progeny per pair of *Euscepes* month by month. The latter records are subject to the qualification of being laboratory records, but they furnish reasonable approximation to field conditions, enabling an answer to be given to the possibility of, and rate of, infestation of a potato field due to the factor of using infested cuttings.

Plantings of infested versus non-infested cuttings were tested in randomised plots in adequate field experiments, as were also dipping of slips in chemicals to destroy, if possible, infestation in cuttings prior to planting. Further experiments in randomised plots were made on soil fumigants and on ordinary lead arsenate and colloidal lead arsenate sprays.

The results of four treatments of immediate interest, out of eleven in the above experiments, are tabulated below. It must be noted that a proportion of non-infested slips were taken from some vigorous non-infested vines, as sufficient could not be obtained from the infested source. Also, infested slips were used in *all* other treatments, and an infested slip is one that has evidence of larval infestation, or on which one or more *Euscepes* eggs are found; this

does not mean that in all cases the slip carried a living larva, or that the egg or eggs succeeded in infesting the slip.

TABLE II.

Variety.	Treatment.	Yield per plot in lbs. average from five plots	Weight of potatoes with scarabee per plot, average from five plots, lb.	Net yield in lbs. per plot.
V. 52	Non-infested slips.	92.4	24.6	67.8
V. 52	Infested slips..	69.3	35.4	33.6
V. 52	Vines sprayed with lead arsenate 2 oz. per 4 gallons of water plus molasses. Three applications.	121.5	5.7	115.8
V. 52	Vines sprayed with colloidal lead arsenate 2 pints to 100 gal- lons of water. Three applications.	111.9	6.1	105.8

Other factors leading to infestation of fields, namely migration of the beetles by flight, or infestation due to beetles remaining in the soil, were investigated both in the field and in the laboratory.

An experiment on irrigation versus non-irrigated conditions as a factor in infestation, was started during the year under review and is now in progress.

When this and further experiments on lead arsenate sprays as a control have been concluded, the whole will be analysed, and final results and recommendations as to control measures will be submitted.

Records have also been taken on extent of infestation in randomised plots of different varieties of potatoes; it is not considered, however, that sufficient data has been obtained yet on the influence of variety on scarabee infestation for any recommendations to be made.

PESTS OF COTTON—PINK BOLLWORM (*Platyedra gossypiella*) AND COTTON LEAF WORM (*Alabama argillacea*.)

Infestation by *Platyedra gossypiella* was again linked up this year with defoliation by *Alabama argillacea*. On some plantations, defoliation by the

latter pest was allowed to reach such damaging proportions that the cotton plants were killed, or else so badly set back in growth that no payable picking of cotton could be obtained, quite apart from pink boll worm infestation.

On other plantations, and Departmentally, it was proved that the defoliator *Alabama* can be kept in check by regulated dusting with Paris Green and lime, at a cost per acre which is definitely economic.

Pink boll worm infestation was again serious in the area in which there was the greatest acreage under cotton; this was principally due, it is considered, to an experimental planting of cotton for varietal and manurial trials made in May, 1936, which rendered a close season for cotton in that area non-existent.

Records have shown that *P. gossypiella* emerged over a period of three and a half months, from bolls taken from fields cleared, or being cleared at the end of April, 1936.

Elsewhere, provided *Alabama* was kept in control, payable pickings of cotton per acre were obtained where pink boll worm incidence was low, and where proper attention was paid to picking the cotton as it ripened and not, due to delaying pickings, allowing a large proportion of good cotton to be blown from the bolls by the prevailing winds.

It is still considered that cotton can be grown profitably if proper attention is paid to time of planting, control of defoliators, adequate close season and cleaning of fields, and regular picking of the cotton as it ripens.

TERMITES OR WOOD ANTS.

A temporary officer was appointed during the period under review, primarily to determine the nature and extent of damage in Government warehouses and bonds, and to detect and notify the extent of damage to surrounding buildings and warehouses and to recommend, and if necessary, carry out, control measures.

In many buildings considerable accumulated damage was found, and recommendations have been made accordingly, and further inspection and advisory work have been arranged.

Experiments were also carried out to test five wood preservative and termiticide preparations on seven different kinds of wood, using controls in each case. The results are for Departmental information and for guidance in the recommendation of treatment of wood by painting or brushing on of preparations for preserving wood against termite attack.

Giant Toad (*Bufo Marinus*.)

The breeding in a cement pond of this useful predator is still being carried on, and records of its breeding seasons, etc., accumulated, from which it is hoped that a workable scheme may be evolved for multiplying the giant toad on estates where natural breeding places do not exist, and so maintaining its numbers in the canefields as a control over root borer, brown hardback and

other insect pests. The most serious check to artificial breeding of the toad is the occurrence in ponds of predaceous larvae of large diving beetles (Dytiscidae). These larvae are known as pond dogs, and when present they feed on and may exterminate whole broods of the tadpoles of *Bufo marinus* (the Dytiscidae named in the Barbados collection are *Hydrophilus ater* and *Megadytes giganteus*).

GENERAL INSECT PESTS.

Fields of sweet potato have been found severely damaged in part or in whole by Thrips (*Euthrips insularis* is recorded as attacking sweet potato in Barbados). If infestation by Thrips is noticed early, it can be controlled by uprooting and destroying infested cuttings or newly rooted vines, and by spraying the remainder with a sulphur-oil preparation such as Mulsulphol. If not checked in its early stages, defoliation and severe stunting of growth may be extensive, and control (other than by digging up the field and destroying the vines) impracticable.

One sweet potato field was found damaged in the early stages of growth by the Chrysomelid *Myochrus armatus*, of which adults were present in large numbers girdling and killing the young potato vines or newly planted slips. This is the only case of such damage yet found, and presumably such large concentration of this beetle are rare.

Larvae of *Laphygma frugiperda* frequently damage young corn and guinea corn, sometimes to the extent of causing total loss of the crop; advice in such cases is given according to the extent of the damage when reported.

It was shown this year that the Nematode *Anguillulina mahogani* is probably the primary cause of a disease of mahogany trees in Barbados inasmuch as it was found in apparently undamaged surface wood, cambium, and live bark layers one foot above the visible marks of external damage. The damage caused to mahogany trees is not extensive in distribution and takes the form of a darkening and roughening of the bark from soil level to heights varying up to two or three feet of the entire trunk; this appears to retard growth, and damages the quality of the wood in the portions attacked.

Identifications of, and advice on, various minor insect pests were made during the year.

RAT CONTROL CAMPAIGN.

This was started earlier in 1937 than in other years, provision was made for the issue of freshly mixed bait only, and preparations made for the use of baits composed of rolled oats poisoned with *Thallium sulphate* treated with coconut oil, and put up in packages impregnated with raw linseed oil; so far, however, the latter new type of bait has not been tested in Barbados, because of delays in obtaining the containers in which to put up the baits. The progress of the rat campaign is indicated by the distribution of 2,945 pounds of *Barium carbonate* mixture to ninety-four plantations in 1935, which increased to a distribution of 3,560 pounds to one hundred and seven plantations in 1936.

Business houses in Bridgetown took thirty-three pounds of bait in 1936 and none in 1935.

In 1935, seven hundred and twenty-eight pounds of red squill bait were distributed through tenantries and to peasants, and seven hundred and eighty pounds in 1936; red squill bait is used for issue to peasants as it is not poisonous to human beings or animals other than rats.

No figures are available as to the kill of rats obtained by the above distributions.

(d) REPORT OF THE PLANT DISEASES INSPECTOR

By

D. R. D. WILES, D.I.C.T.A.**(1) MOSAIC DISEASE OF SUGAR CANE.**

The regular inspection of the cane crop for the presence of the mosaic disease of sugar cane was carried out during the period under review.

It was found possible to remove certain areas from the list of Proclaimed Infected Areas while, as a result of these inspections, it was found necessary to make a few additions to the list which were as follows :—

Parish of St. Peter.

All that area bounded on the North by Heywoods Plantation, on the East by the Farm Plantation, on the South by Batalleys and Sweet Home Plantations and on the West by the sea.

Parish of St. Thomas.

All that area included in Chapman's Village and Carrington's Village.

The Corn Close Season extending from the 15th December, 1936 to the 31st March, 1937 for the Proclaimed Infected Areas was again proclaimed, and it is pleasing to record that during this season owners and occupiers within these areas co-operated in trying to make it a success.

The supply of cane plants free from the mosaic disease to those owners and occupiers who were desirous of planting sugar cane was carried out during the planting season.

Distribution was made from the following places under the supervision of an Inspector :—

Parish.	Centre.	Variety.
St. Michael	Belle	B.2935 and B.726.
St. James & St. Thomas	Bennetts	B.2935.
St. George	Groves	B.H.10(12) and B.726.
St. John	Lemon Arbor	B.H.10(12).
St. Joseph	Bloomsbury	B.H.10(12).
St. Peter	Belle	B.2935.

The inspection of plots for the mosaic disease before plants were cut was carried out on a very much larger scale than heretofore, and it is pleasing to record that this service is being made use of throughout the island. There were several occupiers within the Proclaimed Infected Areas who had their plots inspected so as to enable them to obtain their plants from their own plots and only two such occupiers were refused permission.

Reports on Individual Parishes.

Parish of St. Michael.

The infection in this parish is to be found principally in the tenancies of Goodland and the Ivy, both of which are large corn growing areas. The majority of the diseased holes found are in the ratoons and these show the typical symptoms of secondary infection, that is that only part of the stool shows the markings of the disease. It is regrettable that in certain districts outside the Proclaimed Infected Areas the disease has commenced to make its appearance but it is hoped that by constant inspection and the roguing of infected stools that these areas will be free in a short time.

Parish of Christ Church.

The mosaic infection in this parish is to be found in the tenancies of Pegwell and Enterprise with a few stools scattered throughout the parish in very small numbers. These districts are the few in the island in which the variety Ba. 11569 is still found on a fairly extensive scale and it is hoped that by the time the B.2935 or some other variety replaces it that the infection will be considerably lowered.

Parish of St. John.

There was such a decided improvement in the Proclaimed Infected Area of Wakefield Plantation that it was removed from the list of Infected Areas this year. The other Proclaimed Infected Areas in this parish have continued to show a decrease with respect to the mosaic disease, but the infection is still very high especially in the ratoons in Venture Tenantry. The Plantations in the parish with one exception continue to remain fairly free.

Parish of St. Joseph.

The mosaic infection in this parish is to be found in the tenancies of Clevers Hill and Sugar Hill. In the latter tenantry the number of diseased holes found has remained very high due, no doubt, to this area being one in which ratooning is carried on on an extremely large scale, fourth and fifth ratoons being grown. The majority of the infected stools show symptoms of secondary infection and the underlying cause of this is that occupiers in this area do not plant their crop at the proper time. It is however hoped that by constant roguing of the diseased stools and the supply of healthy plants that this area will show signs of improvement.

Parish of St. Peter.

There were no infected holes found on any estates in this parish, the total infection being in the Farm Road Tenantry. This area was placed on the list of Proclaimed Infected Areas and healthy plants were supplied to cane growers during the planting season. It is therefore expected that the infection will be considerably lowered.

Parish of St. James.

The areas of Thorpes Village, Fitts Village and Prospect Tenantry were all removed from the list of Proclaimed Infected Areas during this year as they had been free of infection for the past three years. A careful watch is, however, being kept on them so as to ensure that they will remain free. There

has also been an appreciable decrease in the other infected areas and it is hoped that by constant roguing there will be a further decrease.

Parish of St. Thomas.

The increase in the number of infected holes in this parish necessitated placing Chapman's Village and Carrington's Village in the Proclaimed Infected Areas for the first time. These areas are adjacent to a very heavily infected field of Spring Vale Plantation and it is quite possible that the infection spread from that source. The infection found in the Mt. Wilton fields adjacent to the Sugar Hill Tenantry have shown a decrease in the number of infected holes but care has to be taken to prevent them from becoming reinfected. No infected holes were found in Rock Hall Tenantry for the period under review but a slight infection was observed in the ratoons at Lien Castle and Canefield Plantations which it is expected will be completely free in a short time.

Parish of St. George.

The infected areas in this parish continue to show an improvement due, no doubt, to the supply of healthy plants to the tenancies in the Proclaimed Infected Areas. The estates have remained fairly free, only a few holes being found scattered throughout the parish.

Parish of St. Andrew.

The heavy infection which was observed last year for the first time at Spring Vale Plantation still continues and appears to be confined to the fields of ratoons on the St. Thomas side of the estate. This area being a very heavy ratooning one it is very difficult to note a marked decrease in a short time but it is expected that with the co-operation which the Department's Officer is receiving from the owner and manager that there will soon be a gradual decline in infection.

The majority of infected stools found during the period under review were destroyed to the satisfaction of the Inspectors and it is pleasing to record that it was necessary to lodge only four complaints under the Mosaic Disease (Eradication) Act.

Parish.	1933.			1934.			1935.			1936.		
	Acreage Inspected.	No. of Infected Holes.		Acreage Inspected.	No. of Infected Holes.		Acreage Inspected.	No. of Infected Holes.		Acreage Inspected.	No. of Infected Holes.	
St. Michael ...	3,231 $\frac{1}{4}$	3,511		2,647	7,306		2,437 $\frac{3}{4}$	5,169		2,730	5,242	
Christ Church ...	3,591 $\frac{3}{4}$	419		3,554 $\frac{1}{4}$	369		3,942 $\frac{3}{4}$	451		3,531 $\frac{3}{4}$	698	
St. Lucy ...	2,072 $\frac{3}{4}$	2		89 $\frac{1}{2}$	...		...	...		...	...
St. Peter ...	2,255 $\frac{3}{4}$	328		1,835 $\frac{3}{4}$	449		1,887	188		2,130	655	
St. James ...	1,250 $\frac{1}{4}$	1,802		1,569 $\frac{1}{2}$	2,066		1,782	634		2,343 $\frac{1}{2}$	327	
St. Thomas ...	1,627	668		952 $\frac{1}{4}$	91		1,226 $\frac{1}{2}$	418		1,539 $\frac{1}{4}$	644	
St. Joseph ...	226 $\frac{1}{2}$	6,334		423 $\frac{1}{2}$	2,420		532 $\frac{3}{4}$	2,421		799 $\frac{1}{4}$	3,377	
St. George ...	1,941 $\frac{3}{4}$	2,145		2,773	2,368		2,540 $\frac{1}{2}$	1,535		2,024 $\frac{1}{4}$	572	
St. John ...	1,911 $\frac{1}{4}$	1,529		1,478	1,245		1,548	696		1,572 $\frac{1}{2}$	1,267	
St. Andrew ...	...	...		1,250 $\frac{3}{4}$	90		1,754	2,274		1,011 $\frac{3}{4}$	4,916	
Total ..	18,111 $\frac{1}{4}$	16,738		16,572	16,404		17,651 $\frac{1}{4}$	13,777		17,682 $\frac{1}{4}$	18,688	

(2) **INSPECTIONS UNDER THE COTTON DISEASES
PREVENTION ACT.**

Due to the very heavy attack of the pink bollworm of cotton that was observed during the latter part of the growing period of the cotton crop it was deemed necessary to have a much longer close season than heretofore and this was fixed to extend from the 15th May 1936 to the 15th September 1936. During the close season the old cotton fields were constantly inspected so as to ensure their cleanliness.

The Okra Close Season was again proclaimed to extend from the 16th April to 15th May 1936. Permits were issued as previously and the plots inspected during this period. No permits were cancelled as all the plots were being kept in accordance with regulations.

The cotton crop planted in 1935 and reaped in 1936 realised a yield of 9,594 lb. (18 bales) lint.

Cotton seed for planting was distributed to applicants after 15th September 1936 and 153 acres were planted. An excellent germination was obtained and the trees commenced to boll well. The Cotton Leaf Worm, *Alabama argillacea*, made an early appearance and had dusting with Paris Green and lime been resorted to at the proper time and in the correct manner, the damage done by this pest would have been practically negligible. In spite of this attack it was hoped that the crop would have been far advanced before the pink bollworm made its appearance; this, however, was not the case as weather conditions prevented the pods from developing and ripening, and as the pink bollworm appeared during the latter part of December the yield was materially decreased.

It was felt that to assist in controlling the pink bollworm a longer close season should be proclaimed; this has accordingly been done and the next close season will last for a period of about eighteen months.

The first prize in the Cotton Plot Competition held in November 1936 again went to a plot in St. Philip.

For the period under review the holds of seventeen ships were fumigated with Zyklon B and 7,822 bags of imported cotton seed disinfected by means of the Simon's Heater.

(3) MISCELLANEOUS INSPECTIONS OF IMPORTED PLANTING
MATERIAL.

673 Pkges Bulbs, Rose Trees, Vegetable and Flower Garden Seeds..	..	..	Examined and Passed.	
12 Pkgs Miscellaneous Plants ..	..	..	" "	"
5 Pkgs Miscellaneous Plants ..	..	..	" "	"
15 Pkgs Orchids ..	..	..	" "	"
551 Orchids ..	..	..	" "	"
3 Pkgs Citrus Plants ..	..	..	" "	"
7 Citrus Plants ..	..	..	" "	"
4 Cases Rose Trees ..	..	..	" "	"
7 Rose Trees ..	..	..	" "	"
17 Pkges Lily Bulbs ..	..	..	" "	"
24 Lily Plants ..	..	..	" "	"
14 Mango Plants ..	..	..	" "	"
2 Pkges Carnation Plants ..	..	..	" "	"
2 Nutmeg Plants ..	..	..	" "	"
22 Cacti ..	..	..	" "	"
1 Fern ..	..	..	" "	"
2 Pkges Seed Coconuts ..	..	..	" "	"
6 Pkges Hibiscus Cuttings ..	..	..	" "	"
1 Pkg Bougainvillea Cuttings ..	..	..	" "	"
6 Palms ..	..	..	" "	"
22 Miscellaneous Plants ..	..	..	Roots Washed.	
3 Ferns ..	..	..	" "
1 Mango Plant ..	..	..	" "
28 Palms ..	..	..	" "
25 Lily Plants ..	..	..	" "
12 Hibiscus Plants ..	..	..	" "
1 Pkg. Begonia Cuttings ..	..	..	" "
11 Coconut Plants ..	..	..	Destroyed.	
2 Banana Suckers ..	..	..	"

(e) **REPORT OF PEASANTS' AGRICULTURAL
INSTRUCTOR FOR THE PERIOD APRIL 1ST,
1936—MARCH, 31ST, 1937.**

By

T. O. PHILLIPS

During the period under review visits have been paid to 237 different districts; tabulated as under:—

Parish.	Number of Districts.
St. Joseph ..	38
St. Thomas ..	31
St. John ..	30
St. George ..	45
St. Michael ..	22
St. James ..	14
St. Peter ..	6
St. Lucy ..	8
Christ Church	15
St. Philip ..	13
St. Andrew ..	15
Total ..	237

Revisits have been paid to several of the abovementioned districts.

AGRICULTURAL MEETINGS

Fifteen (15) of these have been held in St. George, St. Andrew, St. John, St. Philip, St. Peter, St. James.

NO. OF PEASANTS INTERVIEWED.

Seventeen hundred and ninety five (1,795) were interviewed during the period under review.

INSECT PEST CONTROL.

Peasants have made greater use of Lead Arsenate and Niagara Emulso than heretofore.

SPRAYING DEMONSTRATIONS.

Fifty six spraying demonstrations were given in districts in which Citrus is grown.

GUATEMALA GRASS.

Twelve hundred (1200) cuttings of this grass were distributed in the Mosaic Disease areas.

SWEET POTATOES.

Five thousand (5,000) cuttings of B.44, B.5 and V.52 were distributed to peasants.

RAT BAIT.

250 lb of this was distributed during the month of May 1936, in 50 villages.

CITRUS.

One hundred (100) citrus plants were distributed to peasants in May. The majority of these are making progress.

CHESHUNT LETTUCE.

Trial packets of this variety of lettuce have been distributed in six (6) districts.

ARROW ROOT.

It is pleasing to report that during the year under review an Arrowroot Growers' Association has been formed in Chalky Mount, St. Andrew and steps are being taken to erect a mill for the manufacture of a better grade of arrowroot.

GINGER.

A wide area of this crop is being planted in the parishes of St. John, St. Joseph, St. Andrew, St. Thomas, St. George and St. James.

A Ginger Growers' Association is in process of being formed.

VEGETABLE SEEDS.

Two (2) lots of Vegetable Seeds were distributed to peasants at cost price.

GROUND NUTS.

This crop is being more extensively grown in Boscobel, the Baltic, St. Peter and College Savannah, St. John, Foul Bay and Merricks, St. Philip, Pie Corner and Crab Hill, St. Lucy.

SCHOOL GARDENS.

Twenty-four (24) school gardens were visited and advice given. Demonstrations in spraying, planting and manuring were given.

WATER COCONUTS.

Orders for Seed Coconuts for planting have been received, and steps are being taken to import some of these from St. Lucia.

(1) GUINEA (2) INDIAN CORN AND (3) CASSAVA.

These industries are being encouraged in the parishes of St. Lucy, St. Philip and St. Peter.

GENERAL.

During the year I was absent on duty leave during the period February 19th—February 24th, to accompany the delegation which visited St. Lucia to investigate a Land Settlement Scheme in that island.

The general state of agriculture amongst the peasants is improving—as peasants are beginning to pay more attention to better methods of cultivation seed selection, manuring, spacing, rotation of crops, insect pest control, and plant selection, and a greater variety of food crops is being grown.

(f) COTTON INVESTIGATIONS.

A. VARIETY AND MANURIAL TRIALS.

During the season 1936-37 a combined variety and manurial trial was started at Mangrove Plantation, St. Philip. Two strains were used, Barbados Sea Island and St. Vincent 135. The manurial treatments were :

1. No manure.
2. 2 cwt. sulphate of ammonia per acre.
3. $1\frac{1}{2}$ cwt. sulphate of potash per acre.
4. 2 cwt. sulphate of ammonia + $1\frac{1}{2}$ cwt. sulphate of potash per acre.
5. 2 cwt. sulphate of ammonia + $1\frac{1}{2}$ cwt. sulphate of potash + 5 cwt. superphosphate per acre.

The lay out was randomised blocks with four replications of each treatment.

The plots were visited at weekly intervals until harvest began. Unfortunately there was such a severe attack of pink boll worm that the plants had to be destroyed before any reliable data could be obtained. It may, however, be mentioned that treatments 2, 4, and 5 were greatly superior in appearance to treatments 1 and 3 both as regards vigour and number of bolls.

Two variety trials were also started at Union Hall, St. Philip, and Spring Hall, St. Lucy. Three varieties were used, Barbados Sea Island, St. Vincent 135 and a Montserrat strain. It is not possible to give the results of these experiments at present as the data of ginning out turn, broker's report, etc. are not ready.

B. THE IMPROVEMENT OF THE EXISTING BARBADOS STRAIN BY SELECTION.

During the season progeny row work was continued at Codrington Experiment Station with eight Selections of Barbados Sea Island (work with these was started in 1933-34) and St. Vincent 135.

As in the past few seasons, selections from Barbados P.170 (viz. P.170-2 and P.170-4) proved superior to the other selections and compared favourably with St. Vincent 135.

The usual laboratory analysis of the seed cotton has not yet been done, but Mr. S. H. Evelyn, the Officer in Charge of the Cotton Station in St. Vincent, who was in Barbados for a few days in transit, was kind enough to make an analysis of the bulk seed cotton from the progeny rows and the results obtained by him are given in a separate Table.

Reference to the table will show that although P.170-2 gave a shorter mean maximum length than some of the other selections, it is much more regular in length, its range is small, 28 of the 50 seeds measured gave individual lengths of 57 mm., also its ginning out turn of 28.5 per cent is higher than any other strain including V.135. P.170-4 gave the same ginning out turn as V.135 (but has lower lint index and seed weight) and has a mean maximum length of 58.2 mm. as compared with 59.7 for V.135. Selfed seed of the two strains P.170-2 and P.170-4 has been retained for multiplication and further progeny row work.

BULK ANALYSIS OF BARRADOS SEA ISLAND AND ST. VINCENT 135 COTTON PROGENY ROWS.

Strain.	Lint Index from 100 seeds of Seed Cotton in milligrams	Seed weight from 100 seeds in milligrams	Ginning out turn.	Frequency arrangement of mean maximum length of lint in millimetres.										Mean maximum length in mm. of 50 seeds.					
				50 mm.	51 mm.	52 mm.	53 mm.	54 mm.	55 mm.	56 mm.	57 mm.	58 mm.	59 mm.		60 mm.	61 mm.	62 mm.	63 mm.	
V 135.	4.4	13.4	24.7									7	7	12	6	9	6	3	59.7
P. 170-2	4.3	10.8	28.5					2	4	6	28	7	3						56.9
P. 170-4	3.6	11.0	24.7					2		5	16	6	8	4	7	2			58.2
P. 170-3	4.3	11.1	27.9	1	1	3	8	4		5	12	12	3	1					55.9
P. 185-4	3.6	11.5	23.8	1	1	2	1			3	15	10	10	4	3				57.1
P. 180-4	4.0	10.8	27.0	1	3	4	13	4	1	3	11	7	1	1	1				55.0
P. 143-1	3.9	12.4	23.9			1	4		3	4	12	10	9	5	2				57.1
P. 143-3	4.1	11.5	26.5				2		3	12	21	7	3		2				56.9
P. 164-4	3.7	11.3	24.7				3	1	3	1	7	14	10	5	4	2			58.1

SECTION III.

FINANCIAL STATEMENT.

EXPENDITURE AND REVENUE.

EXPENDITURE.

	£	s.	d.
Personal Emoluments	7,525	9	8
Travelling Allowances	906	19	3
Exhibition Expenses	143	5	2
Expenses in Control of Sugar Cane Mosaic Disease ..	1,600	0	0
Expenses in Control of Pink Bollworm of Cotton (Salaries of Sub-Inspectors)	337	10	0
Experiment Stations and Botanic Station	1,763	0	5
Chemical Laboratory	718	5	9
Entomology	381	0	10
Science Teaching at Harrison College	1,360	5	2
Analysis of Commercial Sugars and Molasses ..	783	15	8
Seed Distribution	117	15	5
Unforeseen Contingencies	76	10	0
Sundries	239	7	5
Library	59	11	8
	<hr/> £16,012	<hr/> 16	<hr/> 5

REVENUE.

	£	s.	d.
Sale of Ornamental Plants	22	11	5½
Sale of Produce from Codrington Experimental Station	73	12	9½
Sale of Cane Plants under Mosaic Disease Eradication Act	86	8	0
Fees for Analysis of Sugars and Molasses	2,648	4	0
Fees for Analysis of Miscellaneous Samples	53	1	6
Fees for Fumigation of Schooners, etc.	15	15	7½
Miscellaneous Receipts	67	2	11
	<hr/> £2,966	<hr/> 16	<hr/> 3½

SECTION IV.

AGRICULTURAL LEGISLATION DURING 1936—37.

1. *An Act to establish a Bank for the granting of loans to Peasant Owners, 1936—55.*

Under this Act five persons are constituted a body corporate by the name of the Peasants Loan Bank. The Colonial Treasurer is authorised to pay to the credit of the Bank from the Public Treasury a sum not exceeding in the aggregate £10,000. The Bank may receive applications for loans from peasant owners for carrying on the cultivation of peasant holdings and having considered such applications may make loans at interest in such amounts and to such peasant owners as it should think fit. The terms and conditions of loans are set out in the Act.

2. *An Act to regulate the production, marketing and export of Barbados fancy molasses, 1936—62.*

Under this Act which continues in force until 30th November, 1936, a Fancy Molasses Control and Marketing Board is established which recommends to the Governor-in-Executive Committee how the production, price, marketing and export of fancy molasses may be controlled. A tax on all fancy molasses produced in the island during the crop year is raised, levied and collected and the moneys so raised, after the deduction of expenses, shall be allocated among the producers of sugar and fancy molasses in the manner and proportion fixed by the Governor-in-Executive Committee on the advice of the Board and with the approval of both Houses of Legislature.

APPENDIX I.

METEOROLOGICAL OBSERVATIONS RECORDED AT
THE METEOROLOGICAL STATION, CODRINGTON.

HEIGHT ABOVE SEA LEVEL 181 FEET.

Latitude 13° 7' 36" N. Longitude 59° 35' 57" W.

The following are summaries of the observations recorded for the year 1936. The details are given in Appendix II.

Barometric Pressure. The records refer to observations made at the hours of 9.00 a.m. and 3.00 p.m. only and are expressed in inches of mercury. During the year 1936 the mean pressure corrected for temperature and gravity and reduced to sea-level was at 9.00 a.m. 29.969 and at 3.00 p.m. 29.890, the highest pressure recorded being 30.067 on June 27, and the lowest 29.749 on December 10. For the ten-year period 1926-1935 the average barometric pressure was at 9.00 a.m. 29.968 and at 3.00 p.m. 29.898. The highest pressure recorded at 9.00 a.m. during the ten-year period was 30.111 inches on the 14th March, 1926, and the lowest pressure recorded at 3.00 p.m. was 29.704 on the 30th October, 1929.

Temperature: The daily mean maximum temperature for the year 1936 was 85.1°F. and the daily mean minimum 71.8°F. The maximum extreme for the year was 88.5°F. registered on 17th, 18th, 27th of May and 8th and 26th September and the minimum extreme was 64.0°F. registered on 8th and 19th February. The average daily mean temperature was 78.4°F., the highest monthly range 22.0°F., and the lowest 16.0°F., the mean monthly range being 18.9°F. For the ten-year period 1926-35 the daily mean maximum was 85.4°F., and the daily mean minimum 72.5°F. During the ten-year period the average daily mean temperature was 79.0°F., the maximum extreme was 91.5°F. on August 23, 1927, the minimum extreme 63.0°F. on February 18, 1932, and the average monthly range 18.3°F.

Tension of Vapour and Relative Humidity. The mean tension of vapour for the year 1936 was at 8.00 a.m. .758 and at 5.00 p.m. .739. The mean relative humidity was at 8.00 a.m. 74.8 per cent. and at 5.00 p.m. 71.4 per cent.

Wind. The daily (24-hour period) mean velocity of the wind during the year 1936 was 10.5 miles an hour. Records were kept of half-daily or 12-hour periods from 6.00 a.m. to 6 p.m. and 6.00 p.m. to 6.00 a.m. The maximum velocity for any such 12-hour period was 23.1 miles an hour, recorded between 6.00 a.m. and 6.00 p.m. on 1st February and the minimum velocity was 1.9 miles an hour recorded between 6.00 p.m. and 6.00 a.m. on 10th September. The average daily (24-hour period) velocity for the ten years ended 1935 was 9.8 miles an hour.

Rainfall. The rainfall measured at the Government Meteorological Station during the year 1936 amounted to 58.29 inches. Rainfall was recorded on 218 days, the greatest fall being 2.60 inches on the 4th July. For the ten-year period 1926—1935 the average rainfall was 47.19 inches and the average number of days annually on which rain fell was 208.

Rainfall of the Island. The average total rainfall for the year 1936 from 65 stations was 60.22 inches, being 0.12 inches above the average for the eighty-nine years ended December 31, 1935, which was 60.10 inches.

APPENDIX II.
METEOROLOGICAL REPORT FOR 1936.
DEPARTMENT OF AGRICULTURE, BARBADOS.

Height Above Sea-Level 181 feet.

Months.	Barometric Pressure reduced to 32° Fahrenheit, Latitude 45° and Mean Sea Level.					Temperatures.								Tension of Vapour.			Relative Humidity			Velocity miles per hour.	Rainfall.	No. of Days on which rain fell.
	9 a.m.	3 p.m.	Mean.	Highest.	Lowest.	Max. Mean	Min. Mean	Max. Extreme.	Min. Extreme	Mean for Month	Range for Month.	Dew Point 8 a.m.	Dew Point 5 p.m.	8 a.m.	5 p.m.	Mean.	8 a.m.	5 p.m.	Mean.			
January ...	30·009	29·919	29·964	30·066	29·886	83·1	69·7	85·0	66·0	76·4	19·0	66·6	67·4	·658	·675	·667	70·9	70·4	70·6	11·8	1·25	13
February ...	30·010	29·929	29·969	30·066	29·881	83·5	67·9	85·0	64·0	75·7	21·0	65·7	66·1	·636	·651	·643	71·6	66·7	69·1	11·3	·72	12
March ...	29·987	29·902	29·944	30·041	29·860	85·4	68·5	87·5	65·5	76·9	22·0	65·7	64·7	·634	·611	·622	64·7	60·0	62·3	10·4	·13	4
April ...	29·993	29·911	29·952	30·047	29·849	86·4	73·1	88·0	68·5	79·8	19·5	68·6	68·0	·709	·689	·699	68·5	65·4	66·9	15·6	1·59	17
May ...	29·923	29·856	29·889	30·005	29·818	87·2	73·5	88·5	69·0	80·3	19·5	70·9	70·5	·756	·752	·754	70·1	68·4	69·3	11·6	4·60	22
June ...	29·976	29·916	29·946	30·067	29·835	85·6	73·5	87·5	71·5	79·5	16·0	73·2	72·7	·818	·805	·811	77·9	76·2	77·0	10·7	9·55	28
July ...	29·995	29·906	29·950	30·055	29·883	84·6	73·3	87·0	70·5	78·9	16·5	74·0	72·8	·839	·805	·822	81·3	76·8	79·0	11·1	12·49	25
August ...	29·958	29·894	29·926	30·009	29·817	85·9	73·1	88·0	70·0	79·5	18·0	73·9	72·6	·840	·804	·822	80·0	73·2	76·6	7·9	3·96	18
September ...	29·951	29·876	29·913	30·018	29·837	86·6	73·4	88·5	71·0	80·0	17·5	74·1	72·7	·843	·798	·820	79·1	73·6	76·3	7·7	7·46	20
October ...	29·949	29·864	29·906	30·031	29·791	85·7	72·3	87·5	67·5	79·0	20·0	74·1	73·2	·845	·818	·831	80·0	79·7	79·8	7·2	7·21	21
November ...	29·931	29·846	29·888	30·011	29·777	84·3	72·8	87·0	70·0	78·5	17·0	72·6	72·4	·805	·799	·802	78·3	79·2	78·7	10·5	6·54	25
December ...	29·944	29·869	29·906	30·017	29·749	83·2	70·4	85·5	65·0	76·8	20·5	68·8	67·1	·708	·664	·686	75·4	67·2	71·3	10·2	2·79	13
	359·626	358·688	359·153	360·433	357·983	1021·5	861·5	1045·0	818·5	941·3	226·5	848·2	840·2	9·091	8·871	8·979	897·8	856·8	876·9	126·0	58·29	218
	29·969	29·890	29·929	30·036	29·832	85·1	71·8	87·0	68·2	78·4	18·9	70·7	70·0	·758	·739	·748	74·8	71·4	73·1	10·5		

APPENDIX III. **SUMMARY OF BARBADOS RAINFALL FROM JANUARY TO DECEMBER, 1936.**

NAME OF STATION.	No. of Stations	January		February		March		April		May		June		July		August		September		October		November		December		Total	
		Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches	Days	Inches
DISTRICT "A".																											
St. Michael	8	12	1.31	8	.68	1	.05	13	1.75	17	3.84	25	9.02	25	12.08	18	3.45	17	6.53	19	7.57	20	6.66	11	3.11	186	56.05
Lowlands																											
DISTRICT "B".																											
Christ Church	6	9	1.11	9	.96	1	.02	11	1.67	15	2.54	20	8.65	24	12.13	14	2.77	15	6.03	20	7.45	16	4.82	13	3.07	167	51.22
Lowlands																											
St. George	1	13	3.06	10	1.20	3	.25	13	1.82	17	3.97	24	8.21	27	13.49	15	4.67	17	6.50	20	11.43	21	10.74	15	4.95	195	70.29
Highlands																											
Lowlands	6	9	1.58	8	1.11	2	.14	11	1.99	13	3.77	20	9.71	22	12.46	13	3.89	16	5.17	18	8.79	17	6.42	11	3.52	160	58.55
DISTRICT "C".																											
St. Philip	2	11	1.24	9	.59	1	.02	12	.78	14	2.29	20	7.11	23	11.21	16	4.33	14	3.65	17	5.63	21	5.83	12	3.19	170	45.87
Highlands																											
Lowlands	6	9	1.24	9	.97	1	.07	12	1.45	15	2.37	19	7.09	24	10.81	17	3.89	16	4.16	18	6.19	17	4.39	11	2.56	168	45.19
St. John	5	11	2.27	10	1.23	4	.22	11	1.86	16	3.23	21	8.72	26	12.92	18	6.15	15	5.14	19	7.88	21	7.66	14	4.73	186	62.01
Highlands																											
Lowlands	1	11	1.66	5	.64	...	...	7	1.24	12	2.45	21	8.49	24	10.67	20	6.56	15	5.84	18	6.73	15	5.60	12	3.16	160	53.04
DISTRICT "D".																											
St. Thomas	5	13	2.60	11	1.74	3	.19	13	3.30	16	3.69	25	8.35	26	13.60	20	5.82	16	7.55	20	7.81	21	9.04	14	4.41	198	68.10
Highlands																											
Lowlands	2	10	2.00	10	1.16	3	.14	11	2.35	14	2.82	23	7.44	27	11.96	17	4.26	17	5.56	20	8.25	20	7.80	15	2.82	187	56.56
St. James	1	8	2.74	9	2.34	2	.22	13	2.55	10	3.42	22	9.72	22	11.58	19	11.25	15	5.58	22	7.72	20	6.18	13	6.02	175	69.32
Highlands																											
Lowlands	5	13	1.63	11	.98	3	.17	14	2.15	12	2.96	22	9.10	23	11.18	18	7.22	16	6.33	18	6.94	21	7.61	13	3.43	184	59.70
DISTRICT "E".																											
St. Peter	2	10	1.75	9	1.55	4	.18	10	1.75	12	5.26	22	12.04	25	12.52	14	8.54	14	5.24	21	6.86	18	6.73	15	5.43	174	67.85
Highlands																											
Lowlands	4	8	1.65	9	1.72	1	.09	8	1.42	11	4.92	22	11.94	27	11.88	19	10.42	15	5.08	18	5.79	16	4.84	12	4.79	166	64.54
St. Lucy	3	8	.94	9	.91	1	.01	8	.69	13	7.25	21	11.52	26	11.65	20	6.11	17	5.05	19	7.27	18	6.55	13	4.75	173	62.70
Lowlands																											
DISTRICT "F".																											
St. Joseph	4	14	2.37	11	1.34	3	.16	13	2.70	16	3.81	23	9.21	26	12.61	19	7.06	15	6.05	21	7.08	22	7.13	13	5.37	196	64.89
Highlands																											
Lowlands	1	8	1.74	7	.92	2	.23	12	2.03	12	3.98	18	10.93	21	14.20	14	9.39	11	8.55	18	7.85	15	7.45	15	5.87	153	73.14
St. Andrew	2	8	1.11	8	1.28	2	.11	9	1.44	11	3.60	21	9.90	25	10.93	15	7.94	13	6.36	19	7.54	13	5.26	11	4.89	155	60.36
Highlands																											
Lowlands	1	10	.98	9	1.05	2	.11	8	.94	11	3.48	23	12.43	24	10.09	12	4.96	11	2.56	17	9.14	8	5.50	9	3.58	144	54.82
Total	65	195	32.98	171	22.37	39	2.38	209	33.88	257	69.65	412	179.58	467	227.97	318	118.68	285	106.93	362	143.92	340	126.21	242	79.65	3297	1144.20
Average		10	1.74	9	1.18	2	.12	11	1.78	13	3.67	22	9.45	25	12.00	17	6.25	14	5.63	19	7.57	18	6.64	13	4.19	173	60.22